

REMARKS/ARGUMENTS

Claims 27-52, 63-88 and 92-95 are pending in the application. Claims 27, 29, 30, 33, 35, 37, 38, 42, 49, 63, 65, 66, 69, 71, 73, 74, 78, and 85 are amended. No claims are cancelled or added. The amendments to the claims as indicated herein do not add any new matter to this application.

Amendments made to Claims 27, 29, 30, 33, 35, 37, 49, 63, 65, 66, 69, 71, 73, and 85 as indicated herein have been made to exclusively improve readability and clarity of the claims and not for the purpose of overcoming alleged prior art. More specifically, amendments to Claims 27, 29, 30, 33, 35, 37, and 49 have been made to improve readability and clarity (by replacing the pronoun “them” with the term referenced by the pronoun) and in response to the decision reached from *In re Bilski*. Amendments to Claims 63, 65, 66, 69, 71, 73, and 85 have been made to improve readability and clarity (by replacing the pronoun “them” with the term referenced by the pronoun).

INTERVIEW SUMMARY

On Tuesday, March 31, 2009, Applicants, represented by Robert Chee and Brian Hickman, conducted an interview with the USPTO, represented by Examiner Dennis Truong. Claims 27, 38, and 42 of the Application were discussed in relation to the reference, *Hongjun*, and proposed amendments in response to the decision from *In re Bilski* were reviewed. Applicants agreed to submit a formal reply for further consideration by the Examiner.

CLAIM REJECTIONS--35 U.S.C. § 102

Claims 27-28, 38, 42, 63-64, 74 and 78 were rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by Hongjun Lu and Kian-Lee Tan (“Dynamic and Load-balance Task-Oriented Database Query Processing in Parallel Systems”) (“*Hongjun*”). This rejection is respectfully traversed.

As shall be explained below, each pending claim recites at least one limitation that is not anticipated by *Hongjun*.

CLAIM 27

Among other things, Claim 27, recites:

wherein assigning the work partitions in a sequence includes assigning a first previously unassigned work partition to a particular entity of the plurality of entities, and when the particular entity completes processing the first work partition, picking a second previously unassigned work partition based at least in part to the size of the second work partition, and assigning the second unassigned work partition to the particular entity for processing, (emphasis added)

At least the above portions of Claim 27 are not anticipated by *Hongjun*.

With respect to these limitations, the Office Action states that the *Hongjun* anticipates these limitations “as (sec 2.2) ‘ if there are tasks available in the system, the processor will be assigned the next task for execution’ by stating next task, Hongjun inherently teaches that a previous task has been assigned and completed” and “as (3.3.2) ‘amount of data to be transferred is determined in such a way that two processors sharing the load are expected to complete their tasks at the same time... We would like to transfer enough pages of T1 such that a hash table can be built in memory for these pages... We can determine the number of pages to be transmitted that will optimize the load balancing...’ which shows that the amount of data being considered when choosing the next task to be executed to assure that the processors complete the tasks at the same time.” (Office Action, pp. 6-7 and Response to Arguments)

However, as was explained in the Examiner’s Interview, though the reference and Claim 27 have the same goal of performing tasks in parallel most efficiently, the reference and Claim 27 reach these goals quite differently. In Claim 27, an operation is divided into partitions, and these partitions are assigned in a sequence based in part on size to entities to perform the work. The sequence is made prior to any assignments to the entities, and when an entity completes processing of a work partition, a second not yet assigned work partition is assigned to the entity. In *Hongjun*, however, tasks are dynamically assigned to processors and then, in order to load balance the processors, *Hongjun* discloses stealing tasks from processors so that idle processors may perform more work. The tasks stolen are tasks that have *already been assigned* to another processor. The Office Action alleges that Claim 27 is anticipated, in part due to task stealing. However, task stealing is unable to occur for unassigned partitions (as recited in Claim 27), as task stealing only occurs “when there is no more tasks to be assigned”. (*Hongjun*, sec 2.3). Thus, picking previously unassigned work partitions based at least in part to size and assigning the work partition for processing may not be analogized to determining the number of pages to

transfer for task stealing as alleged in the Office Action. Thus, not all limitation of Claim 27 have been anticipated.

Consequently, at least the above elements of Claim 27 are not anticipated by *Hongjun*. As at least one element recited in Claim 27 is not anticipated by the cited art, it is respectfully submitted that Claim 27 is patentable over the cited art and is in condition for allowance.

CLAIM 38

Among other things, Claim 38, recites:

determining a user-specified degree of parallelism to use in performing the operation;
dividing the operation into a set of work partitions;
performing a determination of how many entities to use to perform said operation based, at least in part, on the user-specified degree of parallelism, wherein the amount of entities that are chosen to use to perform on the operation is different than the amount of entities that would have been chosen if no user-specified degree of parallelism had been specified; (emphasis added)

At least the above-bolded portions of Claim 38 are not anticipated by *Hongjun*.

With respect to these limitations, the Office Action states that *Hongjun* anticipates this “as (sec 3.4) which discloses performance evaluation of the algorithm disclosed and 3 other algorithms for parallel processing of queries. This shows the ability to choose among each algorithm and each algorithm provide[s] a different level of parallelism.” (*Office Action*, p. 7). The Office Action (in the Response to Arguments) also states, “In the introduction, Hongjun states ‘tasks are assigned to processors according to some criteria such as the tuple size of data associated to tasks’ the criteria disclosed should be understood as the ‘user-specified degree of parallelism’ where the steps and criteria implemented to provide load balancing disclosed in sec 3.3 so that the processors are optimally used based on the evaluation is the ‘user-specified degree of parallelism’ claimed.” (*Office Action*, p. 3).

As discussed during the Examiner’s Interview, Applicants explained that the “user-specified degree of parallelism” changes how many entities are used to perform said operation. For example, in some cases, a user may specify that no amount of parallelism should be used. (*Written Specification*, col. 10, lines 8-14). The Examiner expressed the concern during the (OID-1993-06-CON2-R)

Interview that user-specified degree of parallelism may be analogized to criteria used to assign tasks to processors (by developers, as developers are users) as mentioned in the Introduction to *Hongjun*. (Office Action, Response to Arguments, p. 3). In response, the amendment “**the amount of entities that are chosen to use to perform on the operation is different than the amount of entities that would have been chosen if no user-specified degree of parallelism had been specified**” has been made to clarify that the user-specified degree of parallelism affects the amount of entities chosen. Specifically, the amount of entities chosen based on the user-specified degree is different than what the system would have chosen if no user-specified degree of parallelism had been specified. The amount of entities that would be chosen if no user-specified degree is present is the amount that would be chosen by the logic that the system’s developers built into the system. Thus, the assertion that user-specified degree of parallelism may be analogized to criteria used to assign tasks to processors (by developers), as alleged by the Office Action, cannot be substantiated.

In addition, *Hongjun*, sec 3.4, states the results of a performance study based upon the algorithm disclosed with experiments varying the number of processors, varying the skewness of data, and varying the number of partitions. The algorithm is actually never changed, only variables within the algorithm. However, *Hongjun* here does not indicate that a “user-specified degree of parallelism” is used, much less used such that the amount of entities that are chosen to use to perform on the operation is different than the amount of entities that would have been chosen if no user-specified degree of parallelism had been specified. Rather, performance data is shown in *Hongjun* but that data is not used to fluctuate the algorithm in any way and thus, at least one limitation of Claim 38 is not anticipated by the reference.

As at least one element recited in Claim 38 is not anticipated by the cited art, it is respectfully submitted that Claim 38 is patentable over the cited art and is in condition for allowance.

CLAIM 42

Among other things, Claim 42, as amended, recites:

**incorporating hints into at least some of said query fragments,
wherein the hint associated with a given query fragment
indicates how to perform the work partition associated with
said given query fragment;**

assigning query fragments from said set of query fragments to a plurality of entities; and
said plurality of entities operating in parallel on query fragments assigned to them to perform said operation, wherein entities working on a query fragment associated with a hint perform the work partition associated with said query fragment in a manner dictated by said hint. (emphasis added)

At least the above-bolded portions of Claim 42 are not anticipated by *Hongjun*.

With respect to these limitations, the Office Action states that *Hongjun* anticipates this “as (sec 3.3.1 and 3.3.2) discloses calculations for estimated finish time based on a task and its properties and using the estimation to determine how to distribute the task to idled processors.” (*Office Action*, p. 8).

In Claim 42, hints are “incorporated ... into at least some ... query fragments” and “indicate how to perform the work partition associated with said given query fragment.” A hint is part of the query fragment itself and is generated when an operation required by a query is divided into a set of work partitions. As context, these hints are incorporated into Data Flow Operator (DFO) SQL and specify various aspects of the execution plan for the DFO SQL statement. (*Written Specification*, col. 11, lines 63-67). As an example, these hints may specify the operation of a table scan, using a particular type of join, or to use a nested loop.

Hongjun, in sec 3.3.1, states how a donor (the processor from which a task is stolen) is determined. A formula is given that may be used to determine an estimated finish time as the measure of a load on a processor. *Hongjun*, sec 3.3.2, then states how determinations are made of the amount of data to be transferred. These calculations and determinations do not indicate how to perform the work partition associated with said given query fragment, nor are these calculations and determinations of *Hongjun* incorporated as part of any query fragment as recited in Claim 42. Thus, determining finishing time and determining how to distribute the task to idled processors depending on the estimated finish time may not be analogized to hints, as is alleged in the Office Action. Thus, at least one limitation of Claim 42 is not anticipated by *Hongjun*.

As at least one element recited in Claim 42 is not anticipated by the cited art, it is respectfully submitted that Claim 42 is patentable over the cited art and is in condition for allowance.

Dependent Claims

Claim 28 depends upon independent Claim 27. Therefore, dependent Claim 28 also includes the limitations of Claim 27. Thus, dependent Claim 28 is patentable for at least those reasons given above with respect to Claim 27. In addition, Claim 28 introduces one or more additional limitations that independently render it patentable. However, due to the fundamental differences already identified, to expedite the positive resolution of this case a separate discussion of those limitations is not included at this time, although the Applicants reserve the right to further point out the differences between the cited art and the novel features recited in the dependent claims.

Claims 63-64, 74, and 78 contain limitations similar to claims 27-28, 38, and 42 except claims 63-64, 74, and 78 are recited in computer-readable medium format. Therefore, claims 63-64, 74, and 78 also are patentable for at least the reasons given above with respect to claims 27-28, 38, and 42.

CONCLUSION

For the reasons set forth above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a formal Notice of Allowance is believed next in order, and that action is most earnestly solicited.

The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

Please charge any shortages or credit any overages to Deposit Account No. 50-1302.

Respectfully submitted,
Hickman Palermo Truong & Becker LLP

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/RobertSChee#58554/
Robert S. Chee, Reg. No. 58,554

2055 Gateway Place, Suite 550
San Jose, California 95110-1083
Telephone No.: (408) 414-1213
Facsimile No.: (408) 414-1076